Claims:

1. A structure for pattern formation adapted for optically forming a pattern, characterized by comprising a photocatalyst-containing layer provided on a substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

2. A structure for pattern formation adapted for optically forming a pattern, characterized by comprising: a substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that is decomposable and removable through photocatalytic action upon pattern-wise exposure.

3. A structure for pattern formation adapted for optically forming a pattern, characterized by comprising: a substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action upon pattern-wise exposure.

4. A structure for pattern formation adapted for optically forming a pattern, characterized by comprising a composition layer, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder.

5. The structure for pattern formation according to any one of claims 1 to 4, characterized in that the photocatalyst-containing layer contains a compound having a siloxane bond.

6. The structure for pattern formation according to any one of claims 1 to 5, characterized in that the photocatalyst-containing layer contains silicone.

7. The structure for pattern formation according to claim 6, characterized in that fluoroalkyl groups are bonded to silicon atoms in the silicone.

8. The structure for pattern formation according to any one of claims 6 and 7, characterized in that the silicone has been prepared from a composition containing an organoalkoxysilane.

9. The structure for pattern formation according to any one of

claims 6 and 7, characterized in that the silicone has been prepared from a composition containing a reactive silicone compound.

10. The structure for pattern formation according to any one of claims 1 to 9, characterized in that the pattern forming structure is an original plate for a printing plate.

11. A method for pattern formation adapted for optically forming a pattern, characterized by exposing pattern-wise

a structure for pattern formation comprising: a substrate; a photocatalyst-containing layer provided on the substrate, the photocatalyst-containing layer containing a material of which the wettability is variable through photocatalytic action,

a structure for pattern formation comprising: a substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer containing a material of which the wettability is variable through photocatalytic action,

a structure for pattern formation comprising: a substrate; a photocatalyst-containing layer provided on the substrate; and, provided on the photocatalyst-containing layer, a layer that, upon pattern-wise exposure, is decomposable and removable through photocatalytic action, or

a structure for pattern formation comprising: a substrate; and a composition layer provided on the substrate, the composition layer comprising a photocatalyst, a material decomposable through photocatalytic action upon pattern-wise exposure, and a binder,

to vary the wettability of the surface of the structure through photocatalytic action.

12. The method for pattern formation according to claim 11, characterized in that the pattern-wise exposure of the photocatalyst-containing layer is carried out by light beam exposure.

13. The method for pattern formation according to claim 11, characterized in that the pattern-wise exposure of the photocatalyst-containing layer is carried out by exposure through a photomask.

14. The method for pattern formation according to claim any one of claims 11 to 13, characterized in that the pattern-wise exposure of the photocatalyst-containing layer is carried out while heating the structure for pattern formation.

15. An element characterized by comprising: a substrate; a structure for pattern formation according to any one of claims 1 to 9 provided on the substrate; and a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure according to any one of claims 11 to 14.

16. An element characterized by being produced by transferring a functional layer onto another substrate, the functional layer being provided on a structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure according to any one of claims 11 to 14.

17. A process for producing an element, characterized by comprising the steps of: providing the structure for pattern formation according to any one of claims 1 to 9 on a substrate; and forming a functional layer provided on the structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure according to any one of claims 11 to 14.

18. A process for producing an element, characterized by comprising the step of transferring a functional layer onto another substrate, the functional layer being provided on a structure for pattern formation in its areas corresponding to a pattern, of the structure for pattern formation, obtained by the pattern-wise exposure according to any one of claims 11 to 14, whereby the functional layer is formed on the another substrate.

19. The process for producing an element according to claim 17, characterized by comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and forming a patterned functional layer on the structure for pattern formation only in its wettability-varied exposed areas by utilizing the repellency of unexposed areas.

20. The process for producing an element according to claim 17, characterized by comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and removing the functional layer in its unexposed areas to form a patterned functional layer.

21. The process for producing an element according to claim 18, characterized by comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and forming a patterned functional layer on the structure for pattern formation only in its wettability-varied exposed areas by utilizing the repellency of unexposed areas.

22. The process for producing an element according to claim 18, characterized by comprising the steps of: forming a composition for a functional layer onto the whole surface of a structure for pattern formation; and removing the functional layer in its unexposed areas to form a patterned functional layer.

23. The process for producing an element according to any one of claims 19 to 22, characterized in that the functional layer is formed on the structure for pattern formation by coating a composition for a functional layer.

24. The process for producing an element according to any one of claims 19 to 22, characterized in that the functional layer is formed on the structure for pattern formation by ejecting a composition for a functional layer through a nozzle.

25. The process for producing an element according to any one of claims 19 to 22, characterized in that the functional layer is formed on the structure for pattern formation by thermal or pressure transfer from a film coated with a composition for a functional layer.

26. The process for producing an element according to any one of claims 19 to 22, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing vacuum.

27. The process for producing an element according to any one of claims 19 to 22, characterized in that the functional layer is formed on the structure for pattern formation by film formation utilizing electroless plating.

28. A color filter characterized by comprising: a transparent substrate; a colored layer provided on the transparent substrate, the colored layer comprising a plurality of colors formed in a predetermined pattern; and a light shielding layer located at each boundary region between two adjacent colored layers, at least one of the colored layer and the light shielding layer having been formed on

the transparent substrate through a wettability-variable component layer in its areas having specific wettability.

29. A color filter characterized by comprising: a transparent substrate; a wettability-variable component layer provided on the transparent substrate; a colored layer of a plurality of colors provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability; and a light shielding layer located at each boundary region between two adjacent colored layers.

30. A color filter characterized by comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; a wettability-varied component layer provided on the transparent substrate so as to cover the light shielding layer; and a colored layer of a plurality of colors provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers.

31. A color filter characterized by comprising: a transparent substrate provided with a light shielding layer in a predetermined pattern; laminates, in number of desired colors, put on the transparent substrate so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers.

32. A color filter characterized by comprising: a transparent substrate; a wettability-varied component layer provided on the transparent substrate; a light shielding layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability; laminates, in the number of desired colors, put on the wettability-variable component layer so as to cover the light shielding layer, the laminates each comprising a wettability-variable component layer and a colored layer provided in a predetermined pattern on the wettability-variable component layer in its areas having specific wettability, the light shielding layer being located at each boundary region between two adjacent colored layers.

33. A color filter according to any one of claims 28 to 32,

characterized in that the areas having specific wettability are areas having high critical surface tension.

34. The color filter according to any one of claims 28 to 33, characterized in that the wettability-variable component layer is a photocatalyst-containing layer comprising at least a binder and a photocatalyst.

35. The color filter according to claim 33 or 34, characterized in that the binder contains an organopolysiloxane prepared from a composition containing a chloro- or alkoxysilane.

36. The color filter according to claim 33 or 34, characterized in that the binder contains an organopolysiloxane prepared from a composition containing a reactive silicone.

37. The color filter according to any one of claims 28 to 33, characterized in that the wettability-variable component layer is an organic polymer resin layer.

38. A process for producing a color filter, characterized by comprising:

the first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer; and

the second step of forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer onto the areas having specific wettability to form a colored layer.

39. The process for producing a color filter according to claim 38, characterized in that, in the first step, a photocatalyst-containing layer comprising at least a binder and a photocatalyst is formed on the transparent substrate and is then irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability, and, in the second step, the photocatalyst-containing layer is irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability.

40. A process for producing a color filter, characterized by comprising:

the first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate provided with a light shielding layer of a predetermined pattern; and

the second step of depositing a coating for a colored layer onto the wettable areas to form a colored layer.

41. The process for producing a color filter according to claim 40, characterized in that, in the first step, a photocatalyst-containing layer comprising at least a binder and a photocatalyst is formed on the transparent substrate provided with the light shielding layer of a predetermined pattern so as to cover the light shielding layer and is then irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability.

42. A process for producing a color filter, characterized by repeating the procedure for forming areas having specific wettability in a predetermined pattern on a transparent substrate, provided with a light shielding layer of a predetermined pattern, and depositing a coating composition for a colored layer onto the areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors.

43. The process for producing a color filter according to claim 42, characterized in that a photocatalyst-containing layer comprising at least a binder and a photocatalyst is formed on the transparent substrate provided with the light shielding layer of a predetermined pattern so as to cover the light shielding layer and is then irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability.

44. A process for producing a color filter, characterized by comprising:

the first step of forming areas having specific wettability in a predetermined pattern on a transparent substrate and depositing a coating for a light shielding layer onto the areas having specific wettability to form a light shielding layer;

the second step of repeating the procedure for forming areas having specific wettability in a predetermined pattern on the transparent substrate and depositing a coating for a colored layer

onto areas having specific wettability to form a colored layer as many times as required to form a necessary number of colored layers of a plurality of colors.

45. The process for producing a color filter according to claim 44, characterized in that, in the first step, a photocatalyst-containing layer comprising at least a binder and a photocatalyst is formed on the transparent substrate and is then irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability, and, in the second step, a photocatalyst-containing layer comprising at least a binder and a photocatalyst is formed so as to cover the light shielding layer and is then irradiated with light to permit light exposed areas to have high critical surface tension through photocatalytic action, thereby forming the areas having specific wettability.

46. The process for producing a color filter according to any one of claims 39, 41, 43, and 45, characterized in that exposure of the photocatalyst-containing layer to light is carried out by any one of pattern-wise exposure through a mask and a light beam exposure.

47. The process for producing a color filter according to any one of claims 38 to 46, characterized in that the deposition of the coating composition for a light shielding layer and/or the coating for a colored layer is carried out by any one of a coating method, a nozzle ejection method, and a vacuum thin film formation method.

48. The process for producing a color filter according to claim 47, characterized in that, in the vacuum thin film formation method, after the formation of a thin film, the thin film formed of a coating for a light shielding layer or a coating for a colored layer deposited on areas other than the areas having specific wettability is removed.

49. A process for producing a lens, characterized by comprising the steps of:

forming a pattern based on a difference in wettability on the surface of a substrate;

depositing a liquid containing a material for a lens on areas having specific wettability of the surface of the substrate; and

curing the liquid containing the material for a lens to form a lens.

50. The process for producing a lens according to claim 49, wherein the substrate is transparent.

51. The process for producing a lens according to claim 49, wherein the lens is a microlens.

52. The process for producing a lens according to claim 51, wherein a plurality of the microlenses are regularly disposed to provide a microlens array.

53. The process for producing a lens according to claim 49, wherein the lenses are colored a single color or a plurality of colors.

54. The process for producing a lens according to claim 52, wherein a plurality of the microlenses, which have been colored a plurality of specific colors, are regularly disposed to provide a color microlens array.

55. The process for producing a lens according to claim 49, wherein the substrate has thereon a photocatalyst-containing layer comprising a photocatalyst and a binder and, upon exposure of the photocatalyst-containing layer to light, a pattern based on a difference in wettability is formed on the surface of the substrate through photocatalytic action.

56. The process for producing a lens according to claim 55, wherein the photocatalyst-containing layer comprises at least a photosemiconductor material as the photocatalyst and a binder component.

57. The process for producing a lens according to claim 55, wherein the liquid containing a material for the lens is deposited onto the substrate in its areas of which the wettability has been varied upon exposure to light.

58. The process for producing a lens according to claim 55, wherein the liquid containing a material for the lens is deposited onto the substrate in its areas of which the wettability has remained unvaried due to unexposure to light.

59. The process for producing a lens according to claim 49, wherein the liquid containing a material for the lens is deposited onto the substrate by coating.

60. The process for producing a lens according to claim 49, wherein the liquid containing a material for the lens is deposited onto the substrate by ejection through a nozzle.

61. The process for producing a lens according to claim 49, wherein the liquid containing a material for the color lens is deposited onto the substrate by ejection through nozzles respectively for necessary colors to provide a color microlens.

62. The process for producing a lens according to claim 49, wherein, with respect to one substrate, the steps described in claim 49 are repeated for each color of the lens to provide an array of color microlenses of a plurality of colors.

63. The process for producing a lens according to claim 49, wherein the amount of the liquid containing a material for the lens deposited onto the substrate is varied to regulate the focal length of the lens.

64. A process for producing a lens having a light shielding layer, characterized in that the process for producing a lens according to claim 50 further comprises the steps of:

forming a pattern, based on a difference in wettability, for a light shielding layer pattern corresponding to a lens pattern onto the transparent substrate on its backside not provided with the lens;

depositing a liquid containing a material for the light shielding layer onto areas having specific wettability of the light shielding layer pattern in the substrate; and

curing the liquid containing the material for the light shielding layer.

65. The process for producing a lens provided with a light shielding layer according to claim 64, wherein the liquid containing a material for the light shielding layer is deposited onto the substrate by coating.

66. The process for producing a lens provided with a light shielding layer according to claim 64, wherein the liquid containing a material for the light shielding layer is deposited onto the substrate by ejection through a nozzle.

67. A lens characterized by comprising: a transparent substrate; a photocatalyst-containing layer of which the wettability is variable through photocatalytic action upon exposure to light; and a lens provided on the photocatalyst-containing layers in its wettability-varied areas or in its wettability-unvaried areas.

68. The lens according to claim 67, wherein a photocatalyst-

containing layer of which the wettability is variable through photocatalytic action upon exposure to light is provided on the backside, of the transparent substrate, not provided with the lens and a light shielding layer pattern corresponding to the lens pattern is provided on the photocatalyst-containing layer in its wettability-varied areas or in its wettability-unvaried areas.

69. A microlens array comprising lenses according to claim 67 or 68, the lenses being microlenses disposed in array.

70. A color microlens array comprising lenses according to claim 67 or 68, the lenses being color mircolenses of a plurality of colors disposed in array.

71. An image sensing device comprising the microlens array according to claim 69 or the color microlens array according to claim 70.

72. A display comprising the microlens array according to claim 69 or the color microlens array according to claim 70.

73. A plate for lithography characterized by comprising: a substrate; a layer provided on the substrate, the wettability of the layer being variable upon pattern-wise exposure; a resin layer provided on areas of which the wettability has been varied upon pattern-wise exposure; and areas that have been hydrophilified or lipophilified upon whole exposure.

74. The plate for lithography according to claim 73, characterized in that the layer of which the wettability is variable upon exposure comprises: a photocatalyst; and a material of which the wettability is variable through photocatalytic action.

75. The plate for lithography according to any one of claim 73 or 74, characterized in that the material of which the wettability is variable comprises a silicone resin.

76. The plate for waterless lithography according to any one of claims 73 to 75, characterized in that the resin layer is ink repellent.

77. The plate for waterless lithography according to any one of claims 73 to 76, characterized in that the ink-repellent resin is a silicone resin.

78. The plate for waterless lithography according to any one of claims 73 to 77, characterized in that the ink-repellent resin is a silicone resin layer that has been crosslinked by a condensation

reaction of SiOH groups with a hydrolyzable crosslinking agent.

79. The plate for waterless lithography according to any one of claims 73 to 77, characterized in that the ink-repellent resin is a silicone resin layer that has been crosslinked by an addition reaction of SiH groups with vinyl groups.

80. The plate for lithography using dampening water according to any one of claims 73 to 75, characterized in that the resin layer is ink receptive and water repellent.

81. A process for producing a plate for lithography, characterized by comprising the steps of: putting a layer onto a substrate, the wettability of the layer being variable through photocatalytic action upon pattern-wise exposure; pattern-wise exposing the layer; coating a resin composition to selectively form a resin layer on wettability-varied areas; and then conducting exposure to vary the wettability of areas not provided with the resin layer.